Arjuna JEE 2023

Basic Maths

DPP-03

1. Exhaustive set of values of 'x' satisfying:

$$\left(\frac{x-x^2}{x^2+2x}\right)\geq 0$$

(1) $x\in(-2, 1]$

(2) $x\in[-2, -1]$

(3) $x\in(-2, 1]-\{0\}$

(4) $x\in(-\infty, -2]\cup[1, \infty)$

2. Complete set of values of 'x' satisfying:

$$\frac{(x-1)^{15}x^{28}}{(x+1)^{2021}(x+2)^{2020}}\geq 0$$

(1) $x\in(-\infty, -1)\cup[1, \infty)$

(2) $x\in(-1, 1]-\{0\}$

(3) $x\in(-\infty, -2]\cup(0, \infty)$

(4) $x\in(-\infty, -2)\cup(-2,-1)\cup[1, \infty)\cup\{0\}$

3. Solution of inequality: $\frac{x-2}{x^2+1}\leq 0$

(1) $x\in[2, \infty)$

(2) $x\in(-\infty,-1)\cup(1, 2]$

(3) $x\in(-\infty, 2]$

(4) $x\in(-1, 1)\cup[2, \infty)$

4. Values of 'x' for which $(x^2 - 3)(x + 1)$ is always negative:

(1) $x\in(-\infty, \sqrt{3})\cup(-1, \sqrt{3})$

(2) $x\in(-\sqrt{3}, \sqrt{3})$

(3) $x\in R$

(4) $x\in(-\sqrt{3}, -1)\cup(\sqrt{3}, \infty)$

5. $\frac{x^2+2x-3}{x^2+1}<0$

6. $x^4 - 2x^2 - 63 \leq 0$

7. $\frac{x+1}{(x-1)^2}<1$

8. $\frac{x^2+6x-7}{x^2+1}\leq 2$

9. $\frac{x^4+x^2+1}{x^2-4x-5}<0$

10. $\frac{1}{x+2}<\frac{3}{x-3}$

11. $\frac{x^2-5x+12}{x^2-4x+5}>3$

12. $\frac{(2-x^2)(x-3)^3}{(x+1)(x^2-3x-4)}\geq 0$

13. $\frac{5-4x}{3x^2-x-4}<4$

14. $\frac{(x+2)(x^2-2x+1)}{4+3x-x^2}\geq 0$

15. $\frac{1}{x-2}+\frac{1}{x-1}>\frac{1}{x}$

Answer Key

1. (3)

2. (4)

3. (3)

4. (1)

5. (–3, 1)

6. [– 3, 3]

7. $(-\infty, 0) \cup (3, +\infty)$

8. $(-\infty, +\infty)$

9. (–1, 5)

10. $(-9/2, -2) \cup (3, +\infty)$

11. (1/2,3)

12. $x \in \left[-\sqrt{2}, -1\right) \cup \left(-1, \sqrt{2}\right) \cup [3, 4)$

13. $(-\infty, \sqrt{7}/2) \cup (-1, \sqrt{7}/2) \cup (4/3, +\infty)$

14. $(-\infty, -2] \cup (-1, 4)$

15. $(-\sqrt{2}, 0) \cup (1, \sqrt{2}) \cup (2, +\infty)$

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